



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-A BYPASS RATIO: 9.5  
 UNIQUE ID NUMBER: 11RR049 PRESSURE RATIO ( $\pi_{00}$ ): 41.0  
 COMBUSTOR: Phase5 Tiled  
 ENGINE TYPE: TF RATED THRUST ( $F_{00}$ ) (kN): 310.8

REGULATORY DATA **\*\* DATA SUPERSEDED \*\*** SEE FOLLOWING UID FOR REVISED DATA: **12RR055**

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>00</sub> (g/kN) or SN	0.1	12.2	59.1	5.8
AS % OF ORIGINAL LIMIT	0.4	10.3	48.4	33.1
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			60.5	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			66.4	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			72.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			82.0	

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 x OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>00</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.282	0.00	0.53	46.67	3.3
CLIMB OUT	85	2.2	1.877	0.00	0.45	35.87	4.1
APPROACH	30	4.0	0.625	0.00	0.77	13.29	2.9
IDLE	7	26.0	0.237	0.06	8.73	5.40	0.6
LTO TOTAL FUEL (kg) or EMISSIONS (g)			74	21	3499	17350	-
NUMBER OF ENGINES				3	3	3	3
NUMBER OF TESTS				5	5	5	5
AVERAGE D <sub>p</sub> /F <sub>00</sub> (g/kN) or AVERAGE SN (MAX)				0.1	11.3	55.8	5.2
SIGMA (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0.1	3.2	0.9	2.0
RANGE (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0-0.1	6.9-14.1	54.9-56.9	3-8.2

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	284.1-290.3
ABS HUMIDITY (kg/kg)	0.00432-0.00721

### FUEL

SPEC	
H/C	1.89
AROM (%)	16.7

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce  
 TEST LOCATION: Derby  
 TEST DATES: 24/09/2009-09/06/2011

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
x	2.3.2 d) (CAEP/6)
	2.3.2 e) (CAEP/8)

### REMARKS

1. Representative of Package B engines

Compliance with Fuel Venting requirements:

- ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)